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10/813,140	03/29/2004	Leopold Werner Kepplinger	P/2154-99	5415

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EXAMINER	
MCNELIS, KATHLEEN A	
ART UNIT	**PAPER NUMBER**
1742	

DATE MAILED: 06/14/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/813,140	KEPPLINGER ET AL.	
	Examiner	Art Unit	
	Kathleen A. McNelis	1742	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *07 April 2006*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-39* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-39* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

Claims Status

Claims 1-39 remain for examination wherein claims 4, 15, 16 and 38 are amended.

Status of Previous Rejections

The previous rejections of claims 1 to 39 under 35 U.S.C. 112 are withdrawn in view of applicants' amendments of the claims.

The previous rejections of claims 1-39 under 35 U.S.C. 103(a) are withdrawn in view of applicant's amendments to the claims.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 1-39 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Page 8 lines 25-29 of the specification support a reducing gas without oxygen being added to reactor 4 (first reactor in gas pathway), however does not support a reducing gas without oxygen in the final reactor in the gas pathway.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 15 and 16 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

It is not clear what is meant by "...a respective temperature level is lower than a respective temperature level in the processes known prior to the invention of the process according to claim..." With respect to claim 15 which depends from claim 1, this could mean either above 600 °C as specified in claim 1, or that the 600 °C specified in claim 1 is lower than processes known prior to the invention. With respect to claim 16 which depends from claim 4, there is no temperature specified in claims 16 or claim 4 for the second reactor zone, therefore one of ordinary skill in the art would not know what temperature the inventor considers to be lower than a respective temperature level in the process known prior to the invention.

For examination purposes, any temperature level specified in particulate pathway zone 2 is assumed to satisfy the limitation.

DETAILED ACTION

Claim Rejections - 35 USC § 103

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claims 1-10, 13-26 and 31-39 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zeller et al. (U.S. Pat. No. 6,569,954) or Zeller et al. (U.S. Pat. No. 6,569,377).

With respect to claim 4, Zeller et al. '954 or Zeller et al. '377 discloses a process for reducing iron oxide-containing material by fluidizaition through a plurality of fluidized

bed reactors arranged in series wherein a supply of reducing gas is conducted through the series of fluidized bed reactors in the opposite direction from the iron oxide material [Zeller et al. '954 (col. 9 line 45 – col. 10 line 16) or Zeller et al. '377 (col. 9 line 40 – col. 10 line 14)]. While not recited in Zeller et al., one of ordinary skill in the art would expect the that the reducing gas does not contain O_2, since the preferred embodiment is disclosed to include adding unused reducing gas to the first fluidized bed zone, whereas an alternative embodiment involves adding oxygen or an oxygen containing gas to effect a partial combustion of the reducing gas [Zeller et al. '954 (col. 10 lines 44 – 54) or Zeller et al. '377 col. 3 line 11 – col. 3 line 22)]. While Zeller et al. '954 or Zeller et al. '377 does not recite the limitation that the maximum reduction speed in the first particulate pathway is 0.2 % oxygen removal per minute from oxygen bound to iron ore, examiner contends in the absence of evidence to the contrary that this would be the case, since Zeller et al. discloses that the measures taken in the invention result in the fluidized bed reactor no longer serving as a reducing zone but rather as a heating zone [Zeller et al. '954 (col. 7 lines 35-39) or Zeller et al. '377 (col. 7 lines 32-35)]. One of the measures taken in Zeller et al. is decreasing the temperature of the reducing gas [Zeller et al. '954 (col. 10 lines 26-28) or Zeller et al. '377 (col. 3 lines 48-50)]. Further, Zeller et al. teaches that one method for lowering the temperature in the first particulate pathway is by directly cooling by adding water [Zeller et al. '954 (col. 11 line 11 – col. 12 line 2) or Zeller et al. '377 (col. 6 lines 64-67), which one of ordinary skill in the art would expect to also increase the degree of oxidation of the reducing gas.

With respect to claims 1-3, Zeller et al. '954 (col. 6 lines 58-67) or Zeller et al. '377 (col. 6 lines 54-63) disclose that the temperature is raised to above 580 °C in the second

reaction zone. The temperature range of above 580 °C overlaps the claimed ranges of at least 600 °C (instant claim 1), between 600 and 700°C (instant claim 2) and between 620 and 660°C (instant claim 2). It would have been obvious to one of ordinary skill in the art at the time the invention was made to raise the temperature in the second reactor of Zeller et al. '954 or Zeller et al. 377 to at least 600 °C or between 600 and 700°C or between 620 and 660°C, since Zeller et al. '954 or Zeller et al. 377 teach equal utility for heating to a temperature above 580 °C.

With respect to claim 5, while Zeller et al. '954 or Zeller et al. '377 does not disclose that the reduction speed is maintained at 0.05 % oxygen removal per minute, examiner asserts in the absence of evidence to the contrary that this would be the case in the first particulate pathway zone, since Zeller et al. discloses that due to the measures taken in the invention result in the fluidized bed reactor no longer serving as a reducing zone but rather as a heating zone [Zeller et al. '954 (col. 7 lines 35-38) or Zeller et al. '377 (col. 7 lines 30-35)].

With respect to claim 6, the particulate material is iron ore [Zeller et al. '954 (col. 2 lines 40-55) or Zeller et al. '377 (col. 2 lines 40-55)].

With respect to claims 7, 8, 17, 18, 23-26, 31, 32 and 39 Zeller et al. '954 or '377 discloses the addition of water or water vapor to reduce the temperature and increase the degree of oxidation of the reducing gas as discussed above regarding claim 4, which examiner contends would both reduce the temperature and increase the degree of oxidation of the reducing gas. Further, as discussed above regarding claim 4, Zeller et al. '954 or '377 teaches that this measure results in the first particulate pathway acting as a heating rather than a reducing zone. Further, with respect to claim 25 and 26, Zeller et

al. '954 or '377 discloses recirculation of reducing gas used in the following zone [Zeller et al. '954 (col. 10 lines 29-33) or Zeller et al. '377 (col. 4 lines 10-16)], which one of ordinary skill in the art would expect to contain a higher amount of carbon dioxide than in fresh reducing gas due to the iron reduction process.

With respect to claims 9 and 10, Zeller et al. '954 or '377 discloses that the temperature is adjusted using indirect cooling [Zeller et al. '954 (col. 10 lines 34-36) or Zeller et al. '377 (col. 3 lines 60-65)].

With respect to claims 13 and 14, Zeller et al. '954 or '377 discloses that the temperature is adjusted to below 400 °C [Zeller et al. '954 (col. 5 lines 30-40) or Zeller et al. '377 (col. 5 lines 25-35)], which overlaps the claimed range of from 350 to 550°C. It would have been obvious to one of ordinary skill in the art at the time the invention was made to cool the first particulate pathway to a temperature of between 350 and 400 °C, since Zeller et al. discloses that any temperature below 400 °C is suitable for the prevention of magnetite formation.

With respect to claims 15 and 16, the temperature in the second reaction zone is increased to above 580 °C as discussed above regarding claims 1-3.

With respect to claims 19-22, Zeller et al. '954 or '377 discloses that the reducing gas feed to the first reaction zone is subjected to cooling [Zeller et al. '954 (col. 10 lines 26-28) or Zeller et al. '377 (col. 3 lines 48-51)] wherein at least a portion of the gas is added fresh reducing gas [Zeller et al. '954 (col. 10 lines 44-48) or Zeller et al. '377 (col. 4 lines 13-19)]. It would have been obvious to one of ordinary skill in the art to use the added fresh gas to effect at least part of the desired cooling.

With respect to claims 33-34, Zeller et al. discloses that the reducing gas feed cooled and scrubbed then a portion of the gas is recycled from the second particulate pathway to the frist particulate pathway [Zeller et al. '954 (col. 6 lines 1-6, Figs 2-6) or Zeller et al. '377 (col. 5 line 66 – col. 6 line 4, Figs 2-6)].

With respect to claim 35 and 36, Zeller et al. '954 or '377 teaches that gas removed (8) from the first particulate pathway reactor is mixed with reformed gas (13), scrubbed (16) and used as reducing gas feed (17). This gas travels upwards through the reaction zones back into the first zone (19, Fig 1).

With respect to claims 37 and 38, Zeller et al. '954 or '377 does not recite that the reducing gas has a CO content under 20% or that the water vapor to carbonaceous gas components range from 2.5 to 5. However, Zeller et al. 954 or '377 show in Figure 9 that the formation of magnetite vs. wustite is a result effective variable dependent upon at least the degree of oxidation, which is shown as a function of the amount of CO, water and carbonaceous gas component (expressed as CO and CO_2). It would therefore have been obvious to one of ordinary skill in the art at the time the invention was made to adjust the amount of CO, water and carbonaceous gas components as result-effective variables to affect the formation of magnetite and wustite (see M.P.E.P 2144.05, II, B).

Claims 11-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zeller et al. (U.S. Pat. No. 6,569,954) or Zeller et al. (U.S. Pat. No. 6,569,377) as applied to claims 4 and 1 above and further in view of in view of Meissner et al (U.S. Pat. No. 6,488,770).

Zeller et al. '954 or Zeller et al. '377 are applied as discussed above regarding claims 4 and 1.

Zeller et al. '954 or Zeller et al. '377 do not disclose that the particulate is a fine particulate having a particle size of up to 12 mm and is treated in either the form of monograins or a grain strip.

Meissner et al. discloses a monocrystalline powder and monograin membranes produced from powders. Meissner et al. teaches that the powders are simply and inexpensively produced to a uniform size (abstract). It would have been obvious to one of ordinary skill in the art at the time the invention was made to treat monocrystalline or monograin powder as taught by Meissner et al. in the fluidized bed reduction process of Zeller et al. '954 or Zeller et al. '377, since the powder can be simply and inexpensively produced to a uniform size as taught by Meissner et al. Further, one of ordinary skill in the art would expect the particles to be a fine particulate material with size of up to 12 mm, since the process of Zeller et al. '954 or Zeller et al. '377 is a fluidized bed.

Claims 27 and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zeller et al. (U.S. Pat. No. 6,569,954) or Zeller et al. (U.S. Pat. No. 6,569,377) as applied to claims 4 and 1 above and further in view of in view of Whipp (U.S. Pat. No. 5,531,424).

Zeller et al. '954 or Zeller et al. '377 are applied as discussed above regarding claims 4 and 1.

Zeller et al. '954 or Zeller et al. '377 do not disclose that the average retention time for the particulate material in the first pathway is up to 40 minutes.

Whipp ('424) discloses a process for direct reduction in a fluidized bed process (abstract) wherein ore is preheated. Whipp teaches that the residence time required is based on the time required from heat transfer from gas to solids (col. 1 lines 60-66).

Residence time is therefore recognized as result-effective variables in the art, which is varied to affect the solids temperature. It would have been obvious to one of ordinary skill in the art at the time the invention was made to adjust the residence time as result-effective variables to affect the solids temperature (see M.P.E.P 2144.05, II, B).

Claims 29 and 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zeller et al. (U.S. Pat. No. 6,569,954) or Zeller et al. (U.S. Pat. No. 6,569,377) as applied to claims 4 and 1 above and further in view of in view of Whipp (U.S. Pat. No. 5,082,251).

Zeller et al. '954 or Zeller et al. '377 are applied as discussed above regarding claims 4 and 1.

Zeller et al. '954 or Zeller et al. '377 are silent regarding the temperature of the particulate reaction zone, and therefore do not disclose that it is between 760 and 850 °C.

Whipp discloses a similar process wherein an improvement is made to the FIOR processing plant to achieve 90 + % metallization (abstract and Fig. 1). The gas temperature exiting the last one of the particulate pathway reaction zones ("bottom reducing reactor" in Whipp) is 765 ° C (State Tables, col. 22 bottom to col. 24 top, "bottom reducing reactor"), which is within the claimed range of between 760 and 850 ° C. It would have been obvious to one of ordinary skill in the art at the time the invention was made to operate the last particulate pathway temperature at about 765 ° C as taught by Whipp, in the iron reduction process of Zeller et al. '954 or Zeller et al. '377 to achieve 90 + % metallization with substantially similar process equipment as taught by Whipp.

Double Patenting

Claims 4, 8, 10, 18, 21, 22, 24, 26 and 32 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1, 4, 9, 10, 17 of U.S. Patent No. 6,336,954 (Zeller et al. '954). Although the conflicting claims are not identical, they are not patentably distinct from each other because:

- With respect to instant claims 4, 8, 18, 24, 26 and 32, Zeller et al. '954 discloses in claim 1 a process for direct reduction of iron oxide material by fluidization by introducing the reducing gas into a series of fluidized bed zones and introducing the particulate iron oxide in counterflow to the reducing gas, where the temperature of the first fluidized bed is below 400 °C. While Zeller et al. '954 does not recite that the maximum reduction speed is 0.2% oxygen removal per minute; the examiner asserts in the absence of evidence to the contrary that this would be the case given the reactor temperature of less than 400 °C. In claim 4, Zeller et al. '954 discloses cooling the reducing gas which examiner assert will result in no reduction to hardly any reduction of the iron oxide in the first zone. One of ordinary skill in the art would expect that the reducing gas does not contain oxygen, because in claim 9, fresh reducing gas to the first fluidized bed zone, whereas an alternative embodiment (claim 10) involves adding oxygen or an oxygen containing gas to effect a partial combustion of the reducing gas. Further, in claim 17 Zeller et al. '954 discloses cooling the reducing gas by adding water, which examiner contends would also increase the degree of oxidation of the reducing gas.
- With respect to instant claim 10, in claim 17 Zeller et al. '954 discloses cooling the reducing gas by adding water, and in claim 6 Zeller et al. '954 discloses indirect cooling.
- With respect to instant claims 21 and 22, Zeller et al. '954 discloses in claim 4 that the reducing gas feed to the first reaction zone is subjected to cooling and in claim 9 that at least a portion of the gas is added fresh reducing gas.

It would have been obvious to one of ordinary skill in the art to use the added fresh gas to effect at least part of the desired cooling.

Response to Arguments

Applicant's arguments with respect to claims 1-39 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kathleen A. McNelis whose telephone number is 571-272-3554. The examiner can normally be reached on M-F 8:00 AM to 4:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy King can be reached on 571-272-1244. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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